

- species, redescrptions of known species and keys to genera and species. *Mem. zool. Surv. India*. 18(1): 196.
- KRANTZ, G.W. (1978): A Manual of Acarology. 2<sup>nd</sup> edition. Oregon State University Book Stores, Corvallis, Oregon. 509 pp.
- LAHIRI, S., S. PODDER, G.K. SAHA & S.K. GUPTA (2004): Diversity of phytophagous and predatory mites occurring on medicinal plants in Kolkata metropolis. *Proc. zool. Soc. Kolkata* 57(1): 47-52.
- LAHIRI, S., I. ROY, S. PODDER, G.K. SAHA & S.K. GUPTA (2005): Notes on phytophagous and predatory mites of medicinal plants of Kolkata. *Zoos' Print Journal* 20(7): 1931-1932.
- LAL, L. & S.P. MUKHERJEE (1977): A contribution to the knowledge of phytophagous mites infesting medicinal plants. *Sci. & cult.* 43: 313-316.
- MOHANASUNDARAM, M. (2001): Phylogeny of acarina and general classification. Pp. 18-20. In: Rabindra, R.J., P. Karuppuchamy, G. Umopathy, C. Chinniah & V. Balasubramani (Eds): Biodiversity and management of phytophagous mites. Department of Agricultural Entomology, TNAU, Coimbatore.
- PARIA, N.D. (Ed.) (2005): Medicinal plant resources of South West Bengal. Research Wing, Directorate of Forests, Govt. of West Bengal, Kolkata. 198 pp.
- ROLANIA, K. & A. SHARMA (2008): Faunistic observations on mite pests in medicinal agroecosystem. *Insect Environment* 14(2): 67-68.
- ROY, I. & G.K. SAHA (2010): Two new predatory mites (Acari: Bdellidae, Phytoseiidae) collected from medicinal plants in West Bengal, India. *J. Asia Pacific Entomol.* 13: 121-126.
- ROY, I., S.K. GUPTA & G.K. SAHA (2006): Two new species of Prostigmatid mites infesting medicinal plants in West Bengal, India. *Entomon.* 31(4): 307-313.
- ROY, I., S.K. GUPTA & G.K. SAHA (2008a): A new species and a new record of phytoseiid mites infesting medicinal plants of West Bengal, India. *Proc. zool. Soc. Kolkata* 61(1&2): 1-4.
- ROY, I., S.K. GUPTA & G.K. SAHA (2008b): New reports of predatory mites (Acari: Prostigmata, Mesostigmata) from medicinal plants of Darjeeling district, West Bengal, India, with description of a new species. *Entomon.* 33(2): 119-128.
- ROY, I., S.K. GUPTA & G.K. SAHA (2008c): Notes on the occurrence of mites infesting medicinal plants of Darjeeling Himalayas. *Insect Environment* 14(3): 130-132.
- ROY, I., S.K. GUPTA & G.K. SAHA (2009): Description of a new species of *Tydeus* Koch (Prostigmata: Tydeidae) infesting medicinal plant *Justicia adhatoda* L. Nees with a note on its biology. *J. Bombay Nat. Hist. Soc.* 106(1): 83-85.
- ROY, I., S.K. GUPTA & G.K. SAHA (2010): Predatory mites of the genus *Agistemus* (Acari: Stigmaceidae) from medicinal plants of West Bengal, India, with description of a new species. *Entomon.* 34(3): 175-180.
- SADANA, G.L., S.C. CHABRA & N. KUMARI (1981): New records of tetranychid mites of ornamental and medicinal plants and their hosts from Punjab state. *Entomon.* 6(4): 325-327.

9. FIRST RECORD OF *LIOCHELES NIGRIPES* (POCOCK, 1897)  
(SCORPIONES: HEMISCORPIIDAE) FROM CHHATTISGARH,  
WITH COMMENTS ON ITS DISTRIBUTION

AMOD ZAMBRE<sup>1</sup> AND SUNNY PATIL<sup>2</sup>

<sup>1</sup>'Saraswati' 72/11, Gulmohar Path, Erandwane, Pune 411 004, Maharashtra, India. Email: amodzambre@gmail.com

<sup>2</sup>C-25 B wing 101, Gokuldham, Goregaon (East), Mumbai 400 063, Maharashtra, India. Email: sunnyp22@gmail.com

## Introduction

The scorpion family Hemiscorpiidae currently consists of approximately 12 genera and 93 species globally (Rein 2011). Members of the family are widely distributed throughout tropics and the subtropics of all continents.

The family was previously known as Ischnuridae, but due to nomenclatural conflict with Odonata subfamily (Ischnurinae) it was changed to Liochelidae. In 2005, Soleglad, Fet and Kovařík included the genus *Heteroscorpion* in this family and renamed it Hemiscorpiidae, including in it all genera and species previously included in Liochelidae (Soleglad et al. 2005).

The family is distinguishable by the following set of characters: weak laterally compressed metasoma, tarsomere II of the legs in lateral view forming a right angle with claw base and 'C' type of trichobothrial pattern with only three ventral trichobothria on patella.

In India, Family Hemiscorpiidae is represented by three genera, namely *Lomachus*, *Chromachetes* (endemic) and *Liocheles* comprising of eight species in all (Tikader and Bastawade 1983; Rein 2011).

Of these, genus *Liocheles* is widely distributed in Cameroon (probably imported), Australia, China, India, Indonesia, Laos, Malaysia, Myanmar and Vietnam. An explanation to its wide distribution is given by Polis (1990) ... "The genus *Liocheles*, which hypothetically arose in India, secondarily invaded south-eastern Asia and Indonesia, and eventually Australia. Although Australia was a portion of Gondwanaland, it has been suggested that *Liocheles* dispersed there via land connections between south-eastern Asia and New Guinea, and between New Guinea and Australia at various times during the Cenozoic. This is supported by the fact that the three species of *Liocheles* in Australia are not endemic and are restricted to the north-eastern portion of that continent."

The genus currently comprises of at least six species of which two, namely *Liocheles nigripes* and *Liocheles australasiae* have been reported from India. Of these *Liocheles australasiae* is known only from the Andaman and Nicobar Islands, making *Liocheles nigripes* the sole representative of genus *Liocheles* from mainland India (Tikader and Bastawade 1983; Kovařík and Fet 2006). Apart

(c. 120 m above msl) and Almora, presently Uttarakhand (c. 1,642 m above msl; northernmost report) in India. Tikader and Bastawade (1983) report the species from only two localities, Panch Mahal and Udaipur (c. 598 m above msl), Rajasthan, India, without any citation of the other localities recorded by Caius (1942).

This communication deals with the first record of this species from the Indian state of Chhattisgarh based on a single female specimen collected from Kanger Valley National Park (KVNP), Bastar district, Chhattisgarh, and critically summarises its known distribution in India.

### Methodology

The specimen was obtained while conducting a faunal survey of the Kanger Valley National Park. The individual was observed on a tree bark c. 0.6 m from the ground surface at 20:30 hrs on October 25, 2008. It was an identifiable member of the Hemiscorpidae family (as per Tikader and Bastawade 1983). The specimen was caught and photographed; visible morphological characters and coloration were recorded before preserving it in 70% ethanol. The specimen was examined using a stereobinocular microscope and a digital calliper (nearest to 0.01 mm) was used to record morphometrics. Using keys given by Tikader and Bastawade (1983) and Kovačik and Fet (2006) the specimen was identified as *Liocheles nigripes*.

The specimen is deposited in the collections of Bombay Natural History Society (BNHS)—registration number BNHS-Sc-20. The description of the collected specimen is as follows (trichobothrioxasy as per Vachon 1974):

**Family:** Hemiscorpidae (Pocock 1893)

**Genus:** *Liocheles* (Sundewall 1833)

*Liocheles nigripes* (Pocock 1897)

**Material examined:** INDIA: Female (25.x.2008), Bhainsa Darra, Elevation: c. 552 m above msl, Kanger Valley National Park, Bastar district, Chhattisgarh. Collectors: Dharmendra Khandal, Sachin Rai, Sunny Patil and Ushma Shukla (BNHS-Sc-20). Morphometrics of the examined material are provided in Table 1.

**Coloration in life:** Carapace, mesosoma and metasoma dark brown; Pedipalps and legs dark brown to black. Chelicerae pale brown, telson pale yellow. Pectines, basal piece and genetric operculum yellowish.

**Prosoma:** Carapace smooth, punctate, without carinae, medially depressed and anteriorly notched. Median ocular tubercle weak, smooth, with a pair of large median eyes, tubercle situated anteriorly in a ratio 1:1.5. Lateral ocular tubercles smooth, weak, located on the edge of the lateral margin of the carapace provided with three eyes.

**Table 1:** Morphometrics of female *Liocheles nigripes* recorded with a digital vernier calliper ( $\pm 0.01$  mm)

| Character                | <i>Liocheles nigripes</i><br>(BNHS-Sc-20) (in mm) |
|--------------------------|---|
| Carapace length          | 4.58  |
| Carapace anterior width  | 3.95  |
| Carapace posterior width | 5.22  |
| Mesosoma                 | 9.18  |
| Metasoma (broken)        | 9.15  |
| Vesicle width            | 1.05  |
| Vesicle length           | 1.82  |
| Aculeus length           | 0.53  |
| Femur length             | 3.75  |
| Femur width              | 1.68  |
| Patella length           | 3.77  |
| Patella width            | 2.21  |
| Chela length             | 7.65  |
| Movable finger           | 3.41  |

**Mesosoma:** Tergites smooth, punctate with an elevated medial region. Sternites smooth with slit-like stigmata. Pectines weak, almost one and a half times as long as wide. Middle lamellae inconspicuously divided into three digits. Fulcra distinct. Lamellae and fulcra with minute red setae. Pectinal teeth 6/6 in number. Genital operculum with a distinct median suture. Sternum pentagonal.

**Metasoma:** Weak, setose and punctate. Segment I smooth with weak carinae; Segments II-IV almost entirely smooth except on the inferior carina on segment II; Segment V smooth except on inferior and inferior lateral carinae. Anal rim crenulated medially and lobate laterally. Vesicle globular, densely setose with a short weakly curved aculeus.

**Chelicerae:** Basal segment smooth, ventrally covered with fine hairs. Dentition as per characterized in the family and genus.

**Pedipalps:** Dorsoventrally flat, punctate and granular. Carinae rudimentary. Dentition on fingers on chela in two rows. Trichobothrial pattern Type C on femur, patella and chela (see Fig 1384-1389 in Tikader and Bastawade 1983). Trichobothria Et 2-5 on external surface of chela placed linearly.

**Habitat:** Kanger Valley National Park (KVNP) is located in Bastar district, south Chhattisgarh. It lies between 81° 51' 30"-82° 10' 00" N and 18° 45' 00"-18° 56' 30" E, covering a total area of 200 sq. km. The mean annual rainfall received is c. 1,516 mm of which almost 80% is received from July to August.

Botanically, the region is situated in the transition zone between the southern limits of Sal forests and northern limits of Teak forests. Thus, both plantations overlap in the extent of the Park forming a dense forest classified as Moist

**Table 2:** Table summarizing the forest types and floristic characters of known localities of *L. nigripes*

| Locality | Forest type                      | Characteristic flora  |
|----------|----------------------------------|---|
| Gonda    | <i>Aegle</i> forest (Type 5 E6)  | <i>Aegle marmelos</i> , <i>Diospyros tomentosa</i> and <i>Ziziphus glaberrima</i> |
| Almora   | Moist Temperate Deciduous forest | <i>Aesculus indica</i> and <i>Acer</i> sp.  |
| Udaipur  | Northern Tropical Throne forest  | <i>Acacia</i> and <i>Euphorbia</i> sp.  |

c. 1,516 mm of which almost 80% is received from July to August.

Botanically, the region is situated in the transition zone between the southern limits of Sal forests and northern limits of Teak forests. Thus, both plantations overlap in the extent of the Park forming a dense forest classified as Moist Peninsular Sal Forest, which is characterised by *Shorea robusta*, *Terminalia tomentosa* and *Madhuca indica* (Champion and Seth 2005). Large trees coupled with bamboo (*Dendrocalamus strictus*) thickets make it one of the densest forests of central India. Biogeographically, it falls under zone '3C-Deccan peninsula' and forms boundary with the Eastern Ghats zone.

## Discussion

All historic records of *L. nigripes* from India have been north of 22° N, while the present report from KVNPN is south of 19° 15' N. This is thus the southernmost report of *L. nigripes* from India. This record represents the first record of *L. nigripes* from within the political boundary of Chhattisgarh and extends its previously known range by c. 600 airline kilometres south-east from the closest locality Satna, Madhya Pradesh (Caius 1942). During the surveys in KVNPN *Buthoscorpion politus* and *Lychas* species were found sympatric to *L. nigripes*. These findings merely reflect how little is known of the scorpion fauna of this area, and more generally many parts of India. Thus, the possibility of *L. nigripes* occurring in other similar

contiguous biotypes cannot be ignored.

Interestingly, in India, the species seems to occur in extremely varied forest types over a wide altitudinal range from 120 m above msl (Gonda) – 1,642 m above msl (Almora). The forest types existing at various localities of *L. nigripes* have been summarized (as per Champion and Seth 2005).

Table 2 indicates the presence of *Liocheles nigripes* across a range of biomes from dry thorn, temperate deciduous to moist peninsular Sal forest. These are highly contrasting biotypes, suggesting that the species is either highly generalist in its habits or the presence of a potential species complex comprising of multiple undescribed species. Future collections with precise identification and accurate locality are vital to revalidate current knowledge of this poorly studied species.

## ACKNOWLEDGEMENTS

AZ is indebted to Ramana and Vidya Athreya of Kaati Trust, Pune, for use of their lab facility; Dr. D.B. Bastawade, Varad Giri and Chintan Sheth for reviewing and editing the manuscript, and Dr. Aparna Watve for providing the vegetation data. SP would like to thank Dharmendra Khandal, Ushma Shukla and Sachin Rai for their constant support on the field. We are grateful to Dharmendra for donating photographs of *Liocheles nigripes*.

## REFERENCES

- CAIUS, J.F. (1942): The distribution of the scorpion (*Hormurus nigripes* Pocock), *J. Bombay Nat. Hist. Soc.* 43(1): 112.
- CHAMPION, H.G. & S.K. SETH (2005): A Revised Survey of the Forest Types of India. Natraj Publishers, Dehradun. xxvii + 404 pp.
- KOVAĐIĆ, F. & V. FET (2006): First reports of *Liocheles nigripes* from Indonesia and Malaysia and *Hormiops davidovi* from Malaysia (Scorpiones: Ishnuridae). *Acta Soc. Zool. Bohem.* 64: 57-64.
- POLIS, G.A. (EDS) (1990): The Biology of Scorpions. Stanford University Press. 233 pp.
- REIN, J.O. (2011): Scorpion Files. Norwegian University of Science and Technology, online at: <http://www.ub.ntnu.no/scorpion-files>.
- SOLEGLAD, M.E., V. FET & F. KOVAĐIĆ (2005): The systematic position of the scorpion genera *Heteroscorpion* Birula, 1903 and *Urodacus* Peters, 1861 (Scorpiones: Scorpionoidea). *Euscorpium* 20: 1-38.
- TRIKADER, B.K. & D.B. BASTAWADE (1983): The Fauna of India. Scorpions, Scorpionida: Arachnida, Volume III. Zoological Survey of India. 671 pp.
- VACHON, M. (1974): Etude des caractères utilisés pour classer les familles et les genres de Scorpions. *Bull. Mus. Natl. Hist. Nat.* 140: 857-958.